

# UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET  
Exhibit R-2

DATE: Feb 2006

BUDGET ACTIVITY: 03  
PROGRAM ELEMENT: 0603729N  
PROGRAM ELEMENT TITLE: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
<b>Total PE</b>	68,351	59,327	17,982	10,607	12,448	12,563	12,738
2914 WARFIGHTER PROTECTION ADVANCED TECHNOLOGY							
	19,146	15,827	17,982	10,607	12,448	12,563	12,738
9999 CONGRESSIONAL PLUS-UPS							
	49,205	43,500	0	0	0	0	0

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care, or the logistics of providing self/buddy-carried, life saving technologies for massive battlefield wounds. The National Institutes of Health (NIH) focuses on the basic science of disease processes, not product development. Programs are complementary with those of the Army and are coordinated through the Armed Services Biomedical Research Evaluation Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection Future Capability (FHPFC) Program (formerly titled Warfighter Protection Future Naval Capability) and supports the "Sea Warrior" component of the Naval Transformation Roadmap, medical logistics aspects of "Sea Basing" and expeditionary force medical support associated with "Sea Strike".

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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## B. PROGRAM CHANGE SUMMARY:

	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
FY 2006 President's Budget Submission	66,868	16,068	16,835
Congressional Action	0	43,500	0
Congressional Undistributed Reductions/Rescissions	-52	-241	0
Execution Adjustments	2,900	0	0
FY 2005 SBIR	-1,378	0	0
Program Adjustments	13	0	0
Program Realignment	0	0	1,081
Rate Adjustments	0	0	66
FY 2007 President's Budget Submission	68,351	59,327	17,982

## PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

## C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

## D. ACQUISITION STRATEGY:

Not applicable.

## E. PERFORMANCE METRICS:

Efforts within this PE support the Future Naval Capabilities (FNC) program and are monitored at two levels. At the lower level, each is measured against technical and financial milestones on a monthly basis. Annually, each FNC project is reviewed in depth for technical and transition performance by CNR against requirements approved by the Navy's senior flag level Technical Oversight Group. Routine site visits to performing organizations are conducted to assess programmatic and technical progress. Most are reviewed annually or bi-annually by an independent board of visitors who assess the level and quality of the Science and Technology

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basis for the project. Several of these projects support specific Defense Technology Objectives (DTO) established by the Director, Defense Research and Engineering (DDR&E) and receive a bi-annual technical and programmatic review under DDR&E's Technology Area Review Assessment Program.

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**B. ACCOMPLISHMENTS/PLANNED PROGRAM:**

	FY 2005	FY 2006	FY 2007
CASUALTY CARE AND MANAGEMENT	7,440	7,700	8,585

The goal of Casualty Care and Management is to maximize the continuum of care with lifesaving interventions as far forward as possible, in an increasingly lethal battlespace, with reduced infrastructure and logistics.

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## **FY 2005 Accomplishments:**

- Continued development of drugs and devices for treatment of uncontrolled hemorrhage in the far forward battlefield. Blood loss is the leading cause of preventable death in combat.
- Continued studies into the safety of hypotensive resuscitation to support development of resuscitation fluids that enhance cardiovascular function, tissue perfusion and oxygen delivery. Improved resuscitation fluids are needed to prevent casualty deaths from shock and associated tissue/organ damage.
- Continued development of medical devices to monitor patient status and identify casualties in danger of progressing into hemorrhagic shock. This will improve triage decisions and allocation of medical evacuation resources.
- Continued identification of Food and Drug Administration (FDA) approved products as well as new development of novel therapeutics that protect against the induction of hemorrhagic shock. A reduced need for resuscitation fluids would significantly reduce the medical logistical burden for Naval forces.
- Continued development of casualty management tools and data. These tools and data are required by combat, material development, and medical planners to evaluate the effectiveness of personal protection systems and healthcare support services, and to project future material and training requirements.
- Continued development of an effective analgesic for controlling severe pain that does not have the adverse effects of morphine (cardiorespiratory depression, sedation) or the addiction potential. Naval casualties are expected to "stay in the fight" as long as possible and the use of morphine removes that capability.

## **FY 2006 Plans:**

- Continue all efforts of FY 2005.
- Initiate development of therapeutic interventions in wound management. Focus is to reduce morbidity resulting in a quicker return to duty and to reduce requirement for medical resources.
- Initiate development of a device to rapidly type, cross-match and identify pathogens in fresh whole blood.

## **FY 2007 Plans:**

- Continue all efforts of FY 2006 and expand treatment of uncontrolled hemorrhage effort.

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	FY 2005	FY 2006	FY 2007
CASUALTY PREVENTION	7,479	6,971	7,452

Casualty Prevention includes enhancing warfighter situation awareness and countering threats from disease, battle and non-battle injuries.

## **FY 2005 Accomplishments:**

- Continued development of protective personal gear and physiologic monitoring ensembles to reduce injury risk and enhance personnel safety in warm and cold water operations for Navy divers and completed development of gear for shipboard firefighting and damage control operations and extreme aircraft operations (g-force, altitude and heat protection).
- Continued development of improved hearing protection systems, compounds, and techniques for personnel supporting aircraft operations. Completed animal research on cochlear microdialysis for treatment of hearing loss. This effort was previously accounted for in the Healthy and Fit Force activity.
- Continued development of tools to predict injury related to thermobaric and conventional blast. Understanding the mechanisms involved with organ and neurological damage due to blast is crucial to developing effective protective equipment.
- Completed development of the capability to provide protection of aircrews from laser attacks. No laser protection capability exists for daytime/nighttime protection of aircrew from tunable frequency lasers.
- Completed effort to develop noninvasive diagnostic tests for diseases that produce results in minutes, not hours or days.
- Initiated research into understanding neurological and cognitive effects of blast injuries. There is an increasing amount of information related to the correlation of closed-head blast injury with cognitive and motor deficits as well as long term emotional problems such as Post-Traumatic Stress Disorder (PTSD).
- Initiated research on return-to-duty criteria for heat injury patients.
- Initiated development of decision support tools for controlling disease and non-battle injuries on Navy vessels. Current tools are not targeted at the General Medical Officer and do not focus on human behavioral models.

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## **FY 2006 Plans:**

- Continue all efforts of FY 2005 less those noted as completed above.
- Complete development of tools to predict injury related to thermobaric and conventional blast.
- Complete development of decision support tools for controlling disease and non-battle injuries on Navy vessels.

## **FY 2007 Plans:**

- Continue all efforts of FY 2006 less those noted as completed above and expand neurological effects of blast effort.
- Complete research on return-to-duty criteria for heat injury patients

	FY 2005	FY 2006	FY 2007
HEALTHY AND FIT FORCE	4,227	1,156	1,945

Healthy and Fit Force efforts preserve health and enhance fitness of ready forces against physical and psychological threats through the continuum of peace and war.

FY2006 to FY2007 increase due to continuation/expansion of ongoing efforts.

## **FY 2005 Accomplishments:**

- Continued identification of factors and causes of injury in shipboard and aviation scenarios, and development of exposure guidelines and engineering specifications for preventing mechanical shock-related injury. Muskuloskeletal injury has a major impact on force readiness and warfighter health. Completed initial estimates of factors and solutions for mitigating shock-related injury in Mark V boats.
- Initiated development of treatments for acute warfighter mental health issues. Combat related psychological trauma has been shown to be a major detriment to retention and force readiness.

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## **FY 2006 Plans:**

- Continue all efforts of FY 2005.

## **FY 2007 Plans:**

- Continue all efforts of FY 2006.

## **C. OTHER PROGRAM FUNDING SUMMARY:**

RELATED RDT&E:

NAVY RELATED RDT&E:

- PE 0601153N Defense Research Sciences
- PE 0602235N Common Picture Applied Research
- PE 0602236N Warfighter Sustainment Applied Research
- PE 0603236N Warfighter Sustainment Advanced Technology
- PE 0604771N Medical Development

NON-NAVY RELATED RDT&E:

- PE 0602716A Human Factors Engineering Technology
- PE 0602785A Manpower/Personnel/Training Technology
- PE 0602787A Medical Technology
- PE 0603002A Medical Advanced Technology
- PE 0602202F Human Effectiveness Applied Research
- PE 0603231F Crew Systems and Personnel Protection Technology

## **D. ACQUISITION STRATEGY:**

Not applicable.

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PROJECT NUMBER: 9999 PROJECT TITLE: Congressional Plus-Ups

## CONGRESSIONAL PLUS-UPS:

	FY 2005	FY 2006
ADVANCED WARFIGHTER PROTECTION - COMPOSITE TISSUE TRANSPLANT	0	1,700

This effort supports advanced warfighter protection - composite tissue transplant research.

	FY 2005	FY 2006
ANTIOXIDANT MICRONUTRIENT PROGRAM FOR WARFIGHTER EXPOSURE	589	1,000

Effort evaluated protective effects of a series of antioxidant micronutrient against the adverse effects of blast injuries, ionizing radiation, and hyperbaric oxygen exposures.

	FY 2005	FY 2006
AUTHENTIC TACTICAL FLIGHT SIMULATOR OPERATIONAL VALIDATION	0	1,350

This effort supports authentic tactical flight simulator operational validation research.

	FY 2005	FY 2006
BATTLEFIELD PHARMACEUTICAL TEST	964	0

Effort supported continued development of a pharmaceutical to be used for the resuscitation of combat casualties.

	FY 2005	FY 2006
C. W. BILL YOUNG BONE MARROW R&D PROGRAM	0	30,000

This effort supports the C. W. Bill Young Bone Marrow R&D Program.

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	FY 2005	FY 2006
HEMOSTATIC RESEARCH	964	0

Effort developed a hemostatic agent to rapidly control moderate to severe hemorrhage thereby preventing excessive blood loss in combat casualties. The Navy and Marine Corps will benefit from an inexpensive, easy to use, agent to prevent excessive blood loss in combat casualties.

	FY 2005	FY 2006
HIGH SPEED BLOOD AND FLUID TRANSFUSION EQUIPMENT	1,446	2,100

FY 2005 - Effort supported blood and fluid infusion/transfusion technology.

FY 2006 - This effort supports high speed blood and fluid transfusion equipment research.

	FY 2005	FY 2006
IMPLANTABLE MIDDLE-EAR HEARING SYSTEM	1,446	0

Effort developed a fully-implantable middle-ear transducer technology for use in treatment of noise-induced hearing loss (NIHL).

	FY 2005	FY 2006
INDIVIDUAL WATER PURIFICATION (IWP) PROGRAM	2,893	0

Effort delivered a device that will produce Ringer's lactate resuscitation fluid for injection utilizing any water source (pond, puddle, well, etc).

	FY 2005	FY 2006
INTEGRATED WARFIGHTER BIODEFENSE PROGRAM	0	3,750

This effort supports integrated warfighter biodefense program research.

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	FY 2005	FY 2006
NATIONAL BONE MARROW PROGRAM	28,981	0

Effort supported the National Marrow Program/Registry, funding research associated with transplantation. Research supported new understanding of tissue typing techniques and reduced rejection rates in bone marrow transplant patients.

	FY 2005	FY 2006
NAVAL SPECIAL WARFARE PERFORMANCE AND INJURY PREVENTION PROGRAM	0	1,000

This effort supports Naval special warfare performance and injury prevention program research.

	FY 2005	FY 2006
NAVY MEDICAL SYSTEM CONFIGURATION AND TEST BED (NMSCTB)	5,048	0

Effort established a capability for expediting the delivery of emerging technologies from Navy Medical (R&D) efforts to DoD healthcare. Force health protection technologies developed by the Naval Health Research Center (NHRC) are undergoing further development and systems integration prior to actual field-testing. Effort involved integration into NHRC Integrated Suite of Technologies, development of the capability to import data from other models, and model validation in exercises.

	FY 2005	FY 2006
NURSING TELEHEALTH RESEARCH PROGRAM	2,507	2,600

FY 2005 - Effort established an international consortium of military medical technicians, educators, researchers, and domestic rural health care providers to design and deliver a nurse training curriculum to remote international locations with special emphasis on emergency medical training and humanitarian relief. Efforts established a beta test of the Virtual Clinical Practicum between Walter Reed Army Medical Center and Mount Aloysius College, implemented and evaluated a "Smart Classroom" initiative, and conducted a telehealth-based research study for high cost diabetic patients.

FY 2006 - This effort supports the Nursing Telehealth Research Program.

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	FY 2005	FY 2006
ORGAN TRANSPLANT TECHNOLOGY	1,954	0

Performed trials of newly developed immune therapies designed to achieve tolerance to transplanted tissues without the need for continuous immunosuppression. Continued advanced animal studies to meet necessary requirements in preparation for clinical trials.

	FY 2005	FY 2006
TISSUE AND LIMB TRANSPLANTATION MEDICAL TECHNOLOGY DEVELOPMENT	2,413	0

Effort supported tissue and limb transplantation medical technology development.

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